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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/738,549	12/17/2003	Reza M. Golzarian	109263-133806	8329
25943	7590	04/05/2005	EXAMINER	
SCHWABE, WILLIAMSON & WYATT, P.C. PACWEST CENTER, SUITES 1600-1900 1211 SW FIFTH AVENUE PORTLAND, OR 97204			NGUYEN, GEORGE BINH MINH	
			ART UNIT	PAPER NUMBER
			3723	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/738,549

Applicant(s)

GOLZARIAN ET AL.

Examiner

George Nguyen

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 27,30 and 33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,10-16,18-26,28,29,31 and 32 is/are rejected.
- 7) ☒ Claim(s) 7-9 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 040304,090204.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of Applicant's election filed on November 09, 2004.

Claims 25-33 were added. However, claims 27, 30, and 33 were withdrawn from further consideration because the claims read on non-elected species III of Figures 21.

Thus, claims 1-26, 28-29, and 31-32 are presented for examination.

Receipt is acknowledged of the IDSs file on 043004 and 090204 which have been considered and placed of record in the file.

This application has been filed with formal drawings which are acceptable to the examiner.

1. Applicant's election with traverse of Species I, Figure 13, claims 1-33 in the reply filed on November 09, 2004 is acknowledged. The traversal is on the ground(s) that claims 1-33 read on Species I of Figure 13. This is not found persuasive because claims 27, 30, and 33 read on Figure 21. Thus, claims 27, 30, and 33 were withdrawn from further consideration.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 10-16, 18-22, 25-26, 28-29, 31-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Chopra et al.'6,196,899.

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With reference to FIG. 12, col. 7, line 27 to col. 8, line 29, Chopra discloses the claimed invention including:

- a. control arm (not referenced number).
- b. at least one cylindrical conditioning piece 90.
- c. a rotatable polishing pad 560.
- d. a pivot point M in which control arm is coupled to.
- e. motor M to rotate the control arm.
- f. translational drive means 122 to move the conditioning tool 62 to and from radially with respect to the pad center 554.

Please note that in col. 8, lines 4-29, Chopra discloses the limitations of claims 16 and 18.

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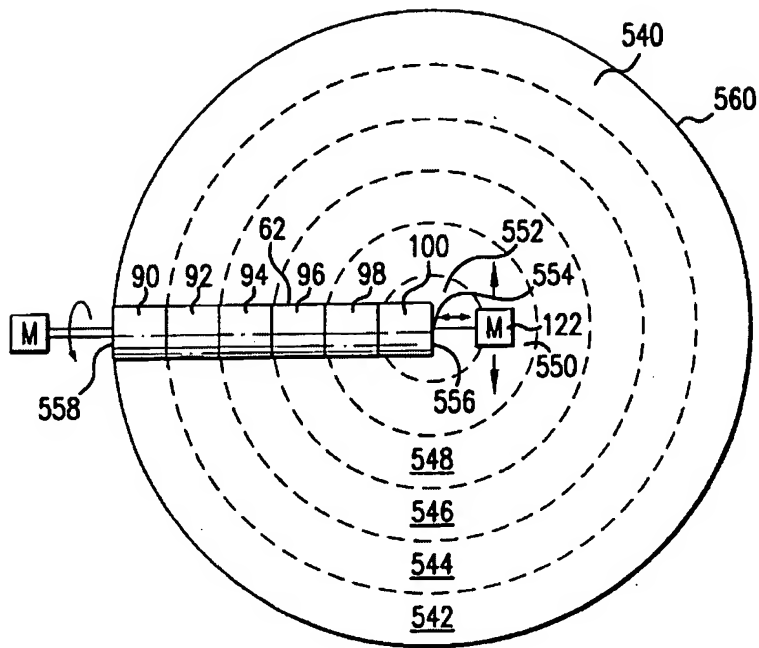


FIG. 12

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against the roller 402, a more intense conditioning treatment is applied. At those portions where the pad 22 is located over relatively low pressure bladders, there is correspondingly less pressure between the pad 22 and the roller 402 and hence less intense conditioning treatments are applied at those locations. The bladders 408-418 may be connected to a suitable pneumatic control system (not shown) such that the pressures in the bladders 408-418 are individually controllable on a real time basis.

FIG. 11 shows another conditioning device 500 constructed in accordance with the present invention. The conditioning device 500 has a roller 402 that applies pressure to the surface 34 of a web-shaped pad 22. The roller 402 is rotated by a suitable motor 306 and drive shaft 304. The back surface of the pad 22 is supported by a rotatable support roller 502. The support roller 502 is rotatably supported with respect to a frame 504 by an axle 506. As the pad 22 moves longitudinally (68, 70, FIG. 2), the support roller 502 rolls underneath the pad 22.

The roller 502 may be provided with inflatable bladder portions 510, 512, 514, 516, 518, 520. The bladder portions 510-520 may be individually inflated to control the intensity of the conditioning applied to the different longitudinal portions 102-112 (FIG. 3) of the polishing surface 34. The pressures in the bladders 510-520 may be changed to account for changed conditions or to achieve a desired conditioning pattern.

Each of the conditioning devices 62, 200, 300, 400, 500 may be used to condition circular polishing pads in addition to the illustrated web-shaped pad 22. By way of example, FIG. 12 shows a conditioning device 62 in position to condition a circular polishing pad 540. In the illustrated embodiment, the radius of the polishing pad 540 is approximately equal to the combined length of the aligned roller segments 90-100.

In alternative embodiments of the invention, the conditioning device 62 may be located other than to one side of the pad 540. The conditioning devices 200, 300 shown in FIGS. 8 and 9, for example, may be sized to fit across the full diameter of the pad 540. That is, the lengths of the rollers 202, 204, 302 shown in FIG. 2 may be greater than the radius of the pad 540.

In another alternative embodiment of the invention, the conditioning device 62 may be positioned at an angle with respect to the radius of the pad 540. That is, the conditioning device 62 may be positioned so that the axis of rotation for the rollers 90-100 does not cross over the center of rotation for the pad 540. Providing an angled position for the conditioning device 62 in this manner may facilitate blending of the conditioning treatment between the rollers 90-100.

In operation, the roller segments 90-100 are rotated at different speeds to provide different conditioning treatments to concentric portions 542, 544, 546, 548, 550, 552 of the pad 540. The pad 540 may be rotated about its center 554 to ensure that the whole surface 542-552 is conditioned. Alternatively, the pad 540 may be held stationary and the conditioning device 62 may be rotated about its inner end 556. That is, the inner end 556 may be maintained at the center 554 of the pad 540 while the outer end 558 is moved by the translational drive means 122 along the entire periphery 560 of the pad 540.

In addition, the translational drive means 122 may move the conditioning device 62 to and fro radially with respect to the pad center 554. This to and fro movement ensures that regions between the concentric portions 542-552 are conditioned even though there are spaces between the roller segments 90-100. In addition, the to and fro radial movement blends the conditioning effect between adjacent sur-

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face portions 542-552 so there are no sharp discontinuities in conditioning treatment between the adjacent surface portions 542-552.

The polishing apparatuses 62, 200, 300, 400, 500 described herein may be used together with a device 570 (FIG. 3) for measuring the planarity of finished wafers 32. The measuring device 570 may be, for example, a multi-point film measurement tool of the type marketed by NovaScan. Data from the measuring device may be processed by a general purpose microprocessor 74 and the results may be used to modify and/or control the conditioning treatments applied to different portions 102-112, 542-552 of the pad 22, 540.

Thus, for example, uniformity data may be used to determine the individual speeds of the roller segments 90-100 (or the pressures applied to the respective longitudinal portions 102-112 of the pad surface 34). Data may also be obtained, if desired, based on measurements of the profile and/or the wear experienced by the pad/web 22, 540. The data may also be used to determine the amount or frequency of the translational movement (122) or the extent to which the conditioning device 62, 200, 300, 400, 500 is moved longitudinally with respect to the pad 22, 540.

Referring to FIG. 13, topographic data from selected points on a finished wafer 32 may be collected by the measuring device (Step 530). The data may be processed and used to update wafer uniformity data stored in a memory 74 (Step 532). The stored uniformity data may be used to selectively update, adjust and/or control the conditioning device 62, 200, 300, 400, 500 (Step 534).

The above descriptions and drawings are only illustrative of preferred embodiments which achieve the features and advantages of the present invention, and it is not intended that the present invention be limited thereto. Any modification of the present invention which comes within the spirit and scope of the following claims is considered part of the present invention.

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A polishing apparatus, comprising:

a support system for movably supporting a polishing pad; a drive system for moving the polishing pad in first and second directions; and

a conditioning device for applying different conditioning treatments to different portions of the surface of the polishing pad, and wherein said conditioning device includes separately driven roller segments, and wherein said roller segments are aligned on a common axis of rotation, and wherein said axis of rotation is angled with respect to the lateral dimension of the polishing pad.

2. A polishing apparatus, comprising:

a support system for movably supporting a polishing pad; a drive system for moving the polishing pad in first and second directions; and

a conditioning device for applying different conditioning treatments to different portions of the surface of the polishing pad, and wherein said conditioning device includes separately driven roller segments, and wherein said conditioning device includes planetary gears meshed with sun gears, said planetary gears and said sun gears being located in said roller segments.

3. The polishing apparatus of claim 2, further comprising a common drive shaft for rotating said sun gears.

4. A polishing apparatus, comprising:

a support system for movably supporting a polishing pad; a drive system for moving the polishing pad in first and second directions; and

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chopra et al.'6,196,899 in view of Kim et al.'5,707,274.

Chopra has been discussed above, but does not disclose a slurry bar including a plurality of outputs.

With reference to Figure 3B, Kim discloses a slurry bar 105 including a plurality of outputs to supply a shower of slurry 107 into the polishing pad. The advantage of the slurry bar is to simultaneously provide slurry to various area of the polishing pad to achieve a uniform slurry distribution.

Regarding to the limitations of “capable of outputting different amounts of fluid”, Official Notice is taken that it is well known to one skilled in the art to be able to vary the flow rate of each output in order to automatically control the polishing rate. Thus, it would have been obvious to one having skill in the art at the time the invention was made to have provided a variable flow rate of each output in order to precisely control the polishing rate of the workpiece.

Allowable Subject Matter

6. Claims 7-9 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The attached PTO-892 provides a list of relevant art regarding the claimed subject matter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 571-272-4491. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 571-272-4485. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

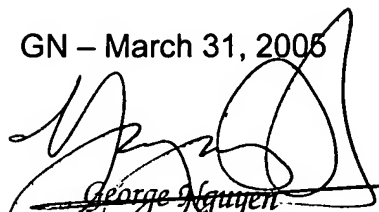
George Nguyen

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Primary Examiner
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GN – March 31, 2005


George Nguyen
Primary Examiner